

(19)



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11)

EP 0 967 443 A2

(12)

## EUROPEAN PATENT APPLICATION

(43) Date of publication:  
29.12.1999 Bull. tin 1999/52

(51) Int Cl.<sup>6</sup> F24F 1/01

(21) Application number: 99850110.0

(22) Date of filing: 22.06.1999

(84) Designated Contracting States:  
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE  
Designated Extension States:  
AL LT LV MK RO SI

(72) Inventor: Biörklund, Staffan  
670 35 Gunnarskog (SE)

(74) Representative: Lundin, Björn-Eric  
Trelleborg AB  
Patents and Trade Marks  
Box 21024  
100 31 Stockholm (SE)

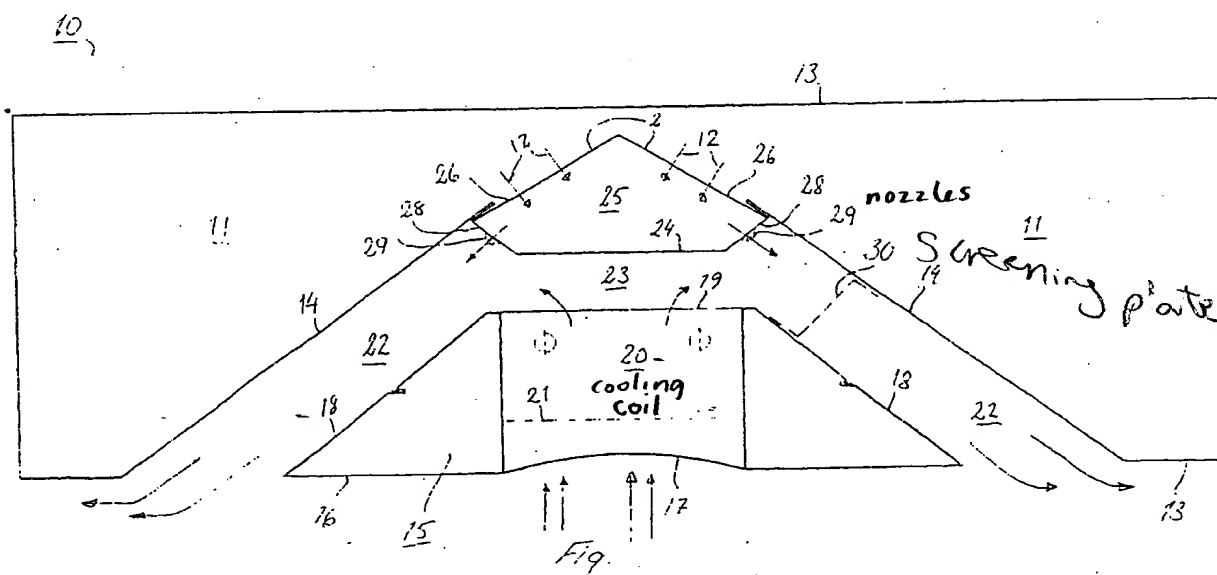
(30) Priority: 23.06.1998 SE 9802215

(71) Applicant: Stifab Farex AB  
671 29 Arvika (SE)

## (54) A room air cooling arrangement

(57) A ceiling mounted room air cooling device comprises a longitudinal primary air channel, a room air cooling coil, a mixing chamber for mixing cooled room air and primary air, means for supplying primary air to the mixing chamber through the medium of an induction effect which serves to suck room air into the device and to pass said air through the cooling coil and into the mixing chamber, and one or more outlet channels through which a mixture of cooled room air and the supplied primary air exit from said device. The device is characterised in that the primary air channel is divided into two

spaces by a longitudinal air-permeable partition wall. The first space receives primary air from an external source and is delimited from the second space with respect to flow. The second space forms that part of the primary air channel in which the primary air supply means is arranged in a partition wall or partition walls delimiting the mixing chamber. The air-permeable partition wall preferably comprises perforated sheet metal. The partition wall or walls between the second space and the mixing chamber will conveniently extend generally transversely to the flow direction in the adjacent outlet channel.



EP 0 967 443 A2

[0009] When comparing inventive cooling baffles with earlier known versions of cooling baffles, it was noted that the sound level generated with the inventive baffles was up to 20% lower than the dBA values generated with the known baffles. However, this can only be seen as an indication to the effect that the inventive baffle generates lower sound levels, since known cooling baffles can generate different sound levels and since the sound levels generated by some older designs may be substantially greater.

[0010] The invention will now be described in more detail with reference to the accompanying drawing, the single Figure of which is a cross-sectional view of a cooling baffle 10 constructed in accordance with a preferred embodiment. The cooling baffle 10 includes a primary air channel having a first space 11 to which primary air 12 is delivered from an external source (not shown). The baffle 10 also includes an outer casing 13, which delimits the primary air channel outwards, and inner walls 14 which delimit the primary air channel against the remainder of the baffle, which comprises a lower part 15 having a lower plate 16 which forms an outer, lower delimiting wall 17 of the lower part 15 and two outlet channel walls 18, and which together with an upper plate 19 also forms an upper delimiting wall of the lower part 15, said plates preferably being removable. The lower part 15 accommodates one or more cooling coils 20 mounted in a coil holder 21 and functioning to cool room air that flows in through openings (not shown) in the lower wall 17. Formed between the outlet channel walls 18 of the lower part 15 and the inner walls 14 bordering on the first space 11 of the primary air channel are outlet channels 22 from a mixing chamber 23 which open out at a level with the lower part of the outer casing 13, which is normally placed on a level with the false ceiling of a room. The mixing chamber 23 is disposed above the lower part 15 and is delimited downwards by the upper plate 19 of the lower part 15, on one side of parts of the inner walls 14 that delimit the space 11, and delimited upwards by a lower air-impermeable delimiting wall 24 of the second space 25 of the primary air channel. The second primary air channel space 25 has a pentahedral cross-sectional shape and is separated from the first primary air channel space 11 by an air-permeable partition wall 26, normally comprised of perforated sheet metal and, in the illustrated case, bent to form an obtuse angle at its upper ridge-like part 27. The space 25 is also delimited by two obliquely extending partition walls 28 which border on the mixing chamber 23 and define generally a right angle with the partition walls 26 and the inner walls 14 extending parallel with said partition walls. Provided in each partition wall 28 in the longitudinal direction of the device 10 are mutually spaced nozzles 29 through which primary air is blown from the primary air channel into the mixing chamber 23. When the cooling baffle shall be used as a 1-way baffle, the nozzles 29 shown in the higher rows may be blocked or removed and the holes plugged. A screening plate 30, shown in a broken

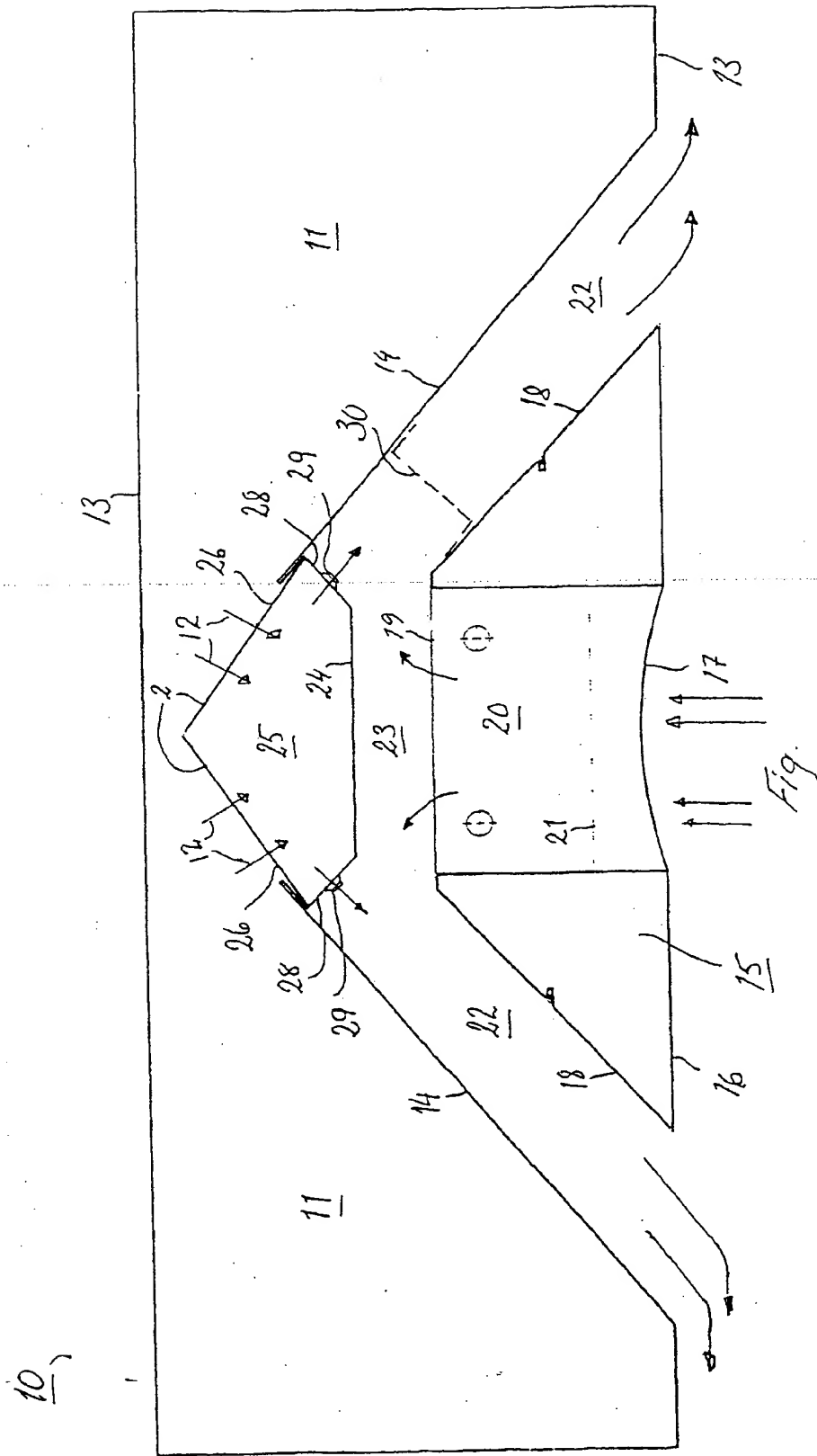
line, may also be fitted in this case.

[0011] When the baffle 10 is in use, the overpressure in the primary air channels 11, 25 will cause primary air 12 to be blown in through the nozzles 29, so as to form a subpressure in the mixing chamber 23. This subpressure contributes towards sucking room air into the baffle (through induction) as illustrated by the upwardly pointing arrows, and up through the cooling coil 20 and into the mixing chamber 23. The primary air blown into the device transports the room air sucked in by induction down through the outlet channels 22 and out along the ceiling of the room, as indicated by arrows. The primary air delivered to and flowing through the first space 11 of the primary air channel flows through the holes in the air-permeable partition wall 26 and moves into the second primary air channel space 25 essentially from above and downwards.

[0012] The reasons for this noticeable effect have not been clearly established, although it is assumed that because the flow pattern from the first primary air channel space 11 is changed with the aid of the air-permeable partition wall 26, such that the primary air will now have kinetic energy that acts essentially in a downward plane, the primary air will flow further through the second primary air space 25 and out through the nozzles 29 with only insignificant eddy currents and therewith low energy losses. The sound generated by these losses will also have a lower level than the sound that would be generated if the air passed through the nozzles 29 directly from the primary air channel 11, where the air has an essentially longitudinal kinetic energy, i.e. in the longitudinal direction of the baffle. Thus, most of the energy available is utilized for induction purposes and less for sound generation.

### Claims

1. A ceiling mounted room air cooling device which includes a longitudinal primary air channel (11, 25), a room air cooling coil (20), a mixing chamber (23) for mixing cooled room air and primary air, means (29) for delivering primary air to the mixing chamber (23) through the medium of induction that serves to suck room air into the device and to pass said air through the cooling coil (20) and to the mixing chamber (23), and one or more outlet channels (22) through which a mixture of cooled room air and the delivered primary air exits from the device, characterised in that the primary air channel (11, 25) is divided into two spaces by means of a longitudinally extending, air-permeable partition wall (26), wherewith the first space (11), to which primary air is delivered from an external source, is delimited with respect to flow from the second space (25), said second space constituting that part of the primary air channel in which said primary air supply means (29) is arranged in the partition wall or partition walls (28) de-



(19)



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11)

**EP 0 967 443 A3**

(12)

**EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:  
27.09.2000 Bulletin 2000/39

(51) Int Cl.7: **F24F 1/01, F24F 13/24**

(43) Date of publication A2:  
29.12.1999 Bulletin 1999/52

(21) Application number: **99850110.0**

(22) Date of filing: **22.06.1999**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE**  
Designated Extension States:  
**AL LT LV MK RO SI**

(72) Inventor: **Biörklund, Staffan**  
**670 35 Gunnarskog (SE)**

(74) Representative: **Lettström, Richard Wilhelm**  
**Albihns Patentbyrå Stockholm AB**  
**P.O. Box 5581**  
**114 85 Stockholm (SE)**

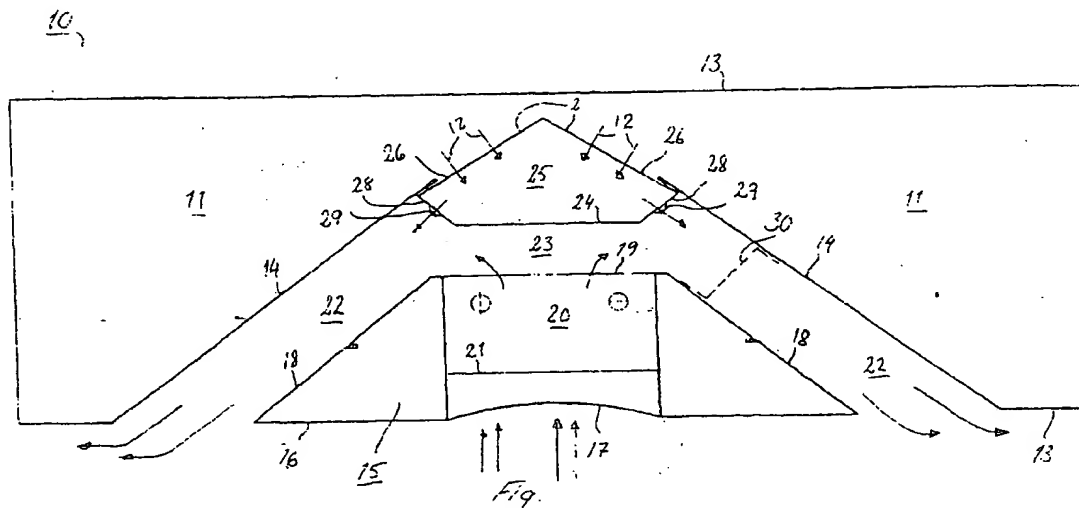
(30) Priority: **23.06.1998 SE 9802215**

(71) Applicant: **Stifab Farex AB**  
**671 29 Arvika (SE)**

**(54) A room air cooling arrangement**

(57) A ceiling mounted room air cooling device comprises a longitudinal primary air channel, a room air cooling coil, a mixing chamber for mixing cooled room air and primary air, means for supplying primary air to the mixing chamber through the medium of an induction effect which serves to suck room air into the device and to pass said air through the cooling coil and into the mixing chamber, and one or more outlet channels through which a mixture of cooled room air and the supplied primary air exit from said device. The device is characterised in that the primary air channel is divided into two

spaces by a longitudinal air-permeable partition wall. The first space receives primary air from an external source and is delimited from the second space with respect to flow. The second space forms that part of the primary air channel in which the primary air supply means is arranged in a partition wall or partition walls delimiting the mixing chamber. The air-permeable partition wall preferably comprises perforated sheet metal. The partition wall or walls between the second space and the mixing chamber will conveniently extend generally transversely to the flow direction in the adjacent outlet channel.



**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 85 0110

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

04-08-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9809115 A	05-03-1998	EP 0857283 A	12-08-1998
		NO 981873 A	25-06-1998
		SE 9603070 A	27-02-1998
EP 0287546 A	19-10-1988	SE 460923 B	04-12-1989
		DE 3867519 A	20-02-1992
		DK 205888 A,B,	17-10-1988
		FI 881737 A,B	17-10-1988
		NO 881620 A,B,	17-10-1988
		SE 8701610 A	17-10-1988
US 5725427 A	10-03-1998	BR 9707184 A	29-06-1999
		CN 1209870 A	03-03-1999
		EP 0876574 A	11-11-1998
		JP 2000504101 T	04-04-2000
		WO 9727434 A	31-07-1997
		US 6059655 A	09-05-2000
US 3824909 A	23-07-1974	NONE	

For more details about this annex : see Official Journal of the European Patent Office, No 12/82